I INTRODUCTION

1.1 General Background

Protein constitutes one kind of specific requirement necessary for survival, and as such the meat industry is one of the major industries in the world. Slaughterhouse, as a source of meat production, is no doubt becoming an essential industry and growing rapidly due to population growth and increase in demand.

In Thailand, the 1959 Acts authorized local government to set up and control the slaughterhouse process to a standard sanitation and hygienic level. Not only physical aspects and quality control but also the management and financing are local authority's responsibility.According to the Acts, if local government cannot cope with the problem or insufficient fiscal budget is offered, privatization may take place but all property must belong to the government. The private sector has to take operational responsibility and pay fees to the local government. No monopoly is allowed and the local government is entirely responsible for problems resulting from this activity.

Slaughterhouse itself produces a huge load of wastewater. In tracing back the last 15 years, there is no record of its treatment in Thailand. The wastewater was simply discharged directly to the nearby natural water courses (Som Youngmaung, 1990).

The wastewater from slaughterhouse contains high levels of organic compounds. In accordance with surveyed data of the Department of Livestock Development, there were approximately 4.1 million pigs and cattles killed in the year 1989. It was estimated that the wastewater generated was 359 US gal or 1.36 m^3 per animal and the concentration of BOD_5, organic nitrogen and suspended solids were

2,240 , 324 and 929 mg/l, respectively. The population equivalent of the wastewater was reported to be 40.2 persons (Wipitch Chaisrisongkram, 1986).

In recent years, the apparent pollution problems from wastewaters were more pronounced regarding the malodor,unaesthetic sights and damage to crops and neighbor's property. To solve these problems, zero discharge was tried by collecting and storing wastewater in ponds but problems still remained. The overwhelming malodour was witnessed, especially during the rainy seasons.

Nowadays, many reserch institutes and central government offices that are involved in the field of wastewater treatment have attempted to transfer the knowledge and technology on treating wastewaters and preserving environmental conditions to the local governments.

Amongst the various technologies, anaerobic treatment is an interesting one. Many advantages are obvious, for example : ease of operation and maintenance as well as low operation cost. The system can be operated satisfactorily in a tropical climate and methane gas can be obtained as a by-product. This has made anaerobic treatment very popular in a relatively short time. Even in cases where methane gas as a by-product is not required, anaerobic system remains an option.

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1.2 Objectives

This research was an experimental work on a slaughterhouse wastewater treatment using two pilot-scale anaerobic processes. The specific objectives were ;

1) to investigate the ultimate hydraulic loading of Fixed Bed reactor and RAUS reactor,

2) to compare the removal efficiency of Fixed Bed Reactor and Reverse Anaerobic Upflow System reactor (RAUS), and

3) to investigate the effects of an increase in hydraulic loading rates on the treatment efficiency.

1.3 Scope of Work

The experimental work concerned mainly with the removal of organic matter in terms of COD at different hydraulic loading rates. The removal of suspended matter was also concerned while alkalinity and volatile fatty acid were observed. The research study was carried out with two pilot-scale reactors which belong to AIT, namely, a Fixed-Bed reactor and RAUS reactor. The wastewater used in the experiment was the actual slaughterhouse wastewater and fed under ambient temperature. During the study, the hydraulic loading was increased thus automatically decreasing the hydraulic retention time, while the feeding schedule and the wastewater used remained the same. Parameters observed in the laboratory included COD, SS, pH, alkalinity, volatile fatty acid,grease and oil, nitrogen, sulphide and phosphorus.

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